WHAT IS CLAIMED IS:

1. A process for forming a silicon-type thin film by high-frequency plasma chemical vapor deposition, wherein silicon fluoride and hydrogen are contained in a material gas and oxygen atoms are incorporated in the material gas in a concentration of from 0.1 ppm to 0.5 ppm based on that of silicon atoms.

2. The process according to claim 1, wherein the hydrogen in the material gas is fed at a flow rate not lower than the flow rate of the silicon fluoride.

3. The process according to claim 1, wherein the silicon-type thin film is formed at a pressure of 50 mTorr or higher.

4. A silicon-type thin film formed by high-frequency plasma chemical vapor deposition, the silicon-type thin film having been formed under conditions that silicon fluoride and hydrogen are contained in a material gas and oxygen atoms are incorporated in the material gas in a concentration of from 0.1 ppm to 0.5 ppm based on that of silicon atoms.

5. The silicon-type thin film according to claim 4, which contains the oxygen atoms in an amount of from 1.5×10^{18} atoms/cm^3 to 5.0×10^{19} atoms/cm^3.

6. The silicon-type thin film according to claim 4, wherein the hydrogen in the material gas has been fed at a flow rate not lower than the flow rate of the silicon fluoride.

7. The silicon-type thin film according to claim 4, wherein the silicon-type thin film has been formed at a pressure of 50 mTorr or higher.

8. The silicon-type thin film according to claim 4, wherein the silicon-type thin film has a Raman scattering intensity due to crystalline component which intensity is at least three times the Raman scattering intensity due to amorphous component.

9. The silicon-type thin film according to claim 4, wherein the silicon-type thin film has a diffraction intensity of the (220)-plane as measured by X-ray or electron-ray diffraction, which is in a proportion of 50% or more with respect to the total diffraction intensity.

10. A photovoltaic device comprising a substrate and formed thereon a semiconductor layer having at least one set of p-i-n junction, wherein at least one i-type semiconductor layer has been formed by a process for forming a silicon-type thin film by high-frequency

plasma chemical vapor deposition, the i-type semiconductor layer having been formed under conditions that silicon fluoride and hydrogen are contained in a material gas and oxygen atoms are incorporated in the material gas in a concentration of from 0.1 ppm to 0.5 ppm based on that of silicon atoms.

11. The photovoltaic device according to claim 10, wherein the i-type semiconductor layer contains the oxygen atoms in an amount of from 1.5×10^{18} atoms/cm^3 to 5.0×10^{19} atoms/cm^3.

12. The photovoltaic device according to claim 10, wherein the hydrogen in the material gas has been fed at a flow rate not lower than the flow rate of the silicon fluoride.

13. The photovoltaic device according to claim 10, wherein the i-type semiconductor layer has been formed at a pressure of 50 mTorr or higher.

14. The photovoltaic device according to claim 10, wherein the i-type semiconductor layer has a Raman scattering intensity due to crystalline component which intensity is at least three times the Raman scattering intensity due to amorphous component.

15. The photovoltaic device according to claim 10, wherein the i-type semiconductor layer has a diffraction intensity of the (220)-plane as measured by X-ray or electron-ray diffraction, which is in a proportion of 50% or more with respect to the total diffraction intensity.

16. A silicon-type thin film containing oxygen atoms in an amount of from 1.5×10^{18} atoms/cm^3 to 5.0×10^{19} atoms/cm^3.

17. The silicon-type thin film according to claim 16, which has a Raman scattering intensity due to crystalline component which intensity is at least three times the Raman scattering intensity due to amorphous component.

18. The silicon-type thin film according to claim 16, which has a diffraction intensity of the (220)-plane as measured by X-ray or electron-ray diffraction, which is in a proportion of 50% or more with respect to the total diffraction intensity.

19. A photovoltaic device comprising a substrate and formed thereon a semiconductor layer having at least one set of p-i-n junction, wherein at least one i-type semiconductor layer contains oxygen atoms in an

amount of from 1.5×10^{18} atoms/cm^3 to 5.0×10^{19} atoms/cm^3.

20. The photovoltaic device according to claim 19, wherein the i-type semiconductor layer has a Raman scattering intensity due to crystalline component which intensity is at least three times the Raman scattering intensity due to amorphous component.

21. The photovoltaic device according to claim 19, wherein the i-type semiconductor layer has a diffraction intensity of the (220)-plane as measured by X-ray or electron-ray diffraction, which is in a proportion of 50% or more with respect to the total diffraction intensity.